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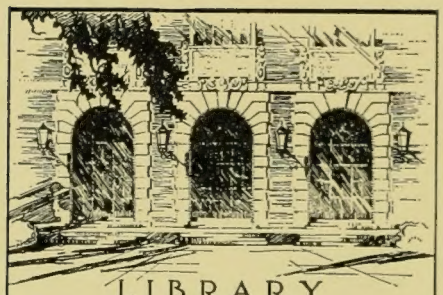

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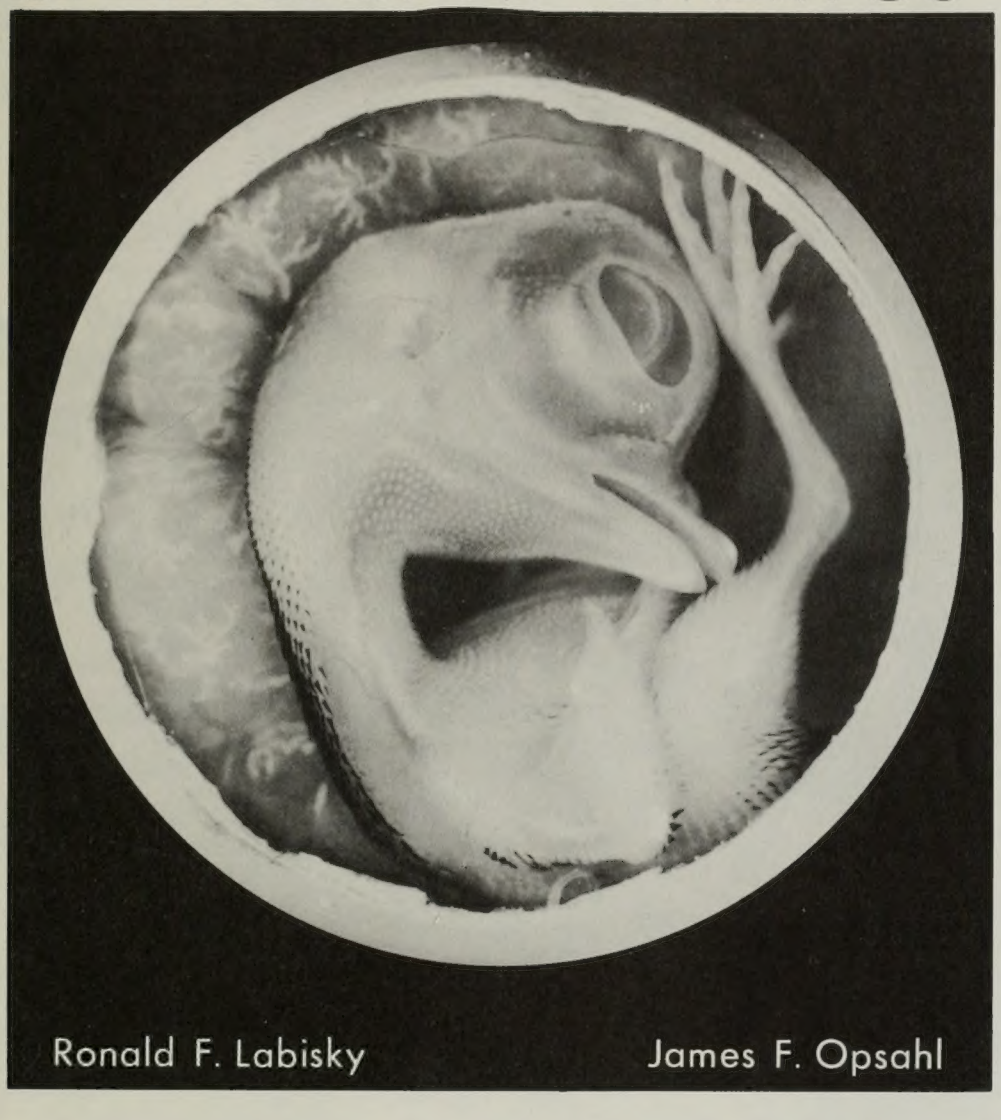
A GUIDE TO AGING OF *PHEASANT EMBRYOS*



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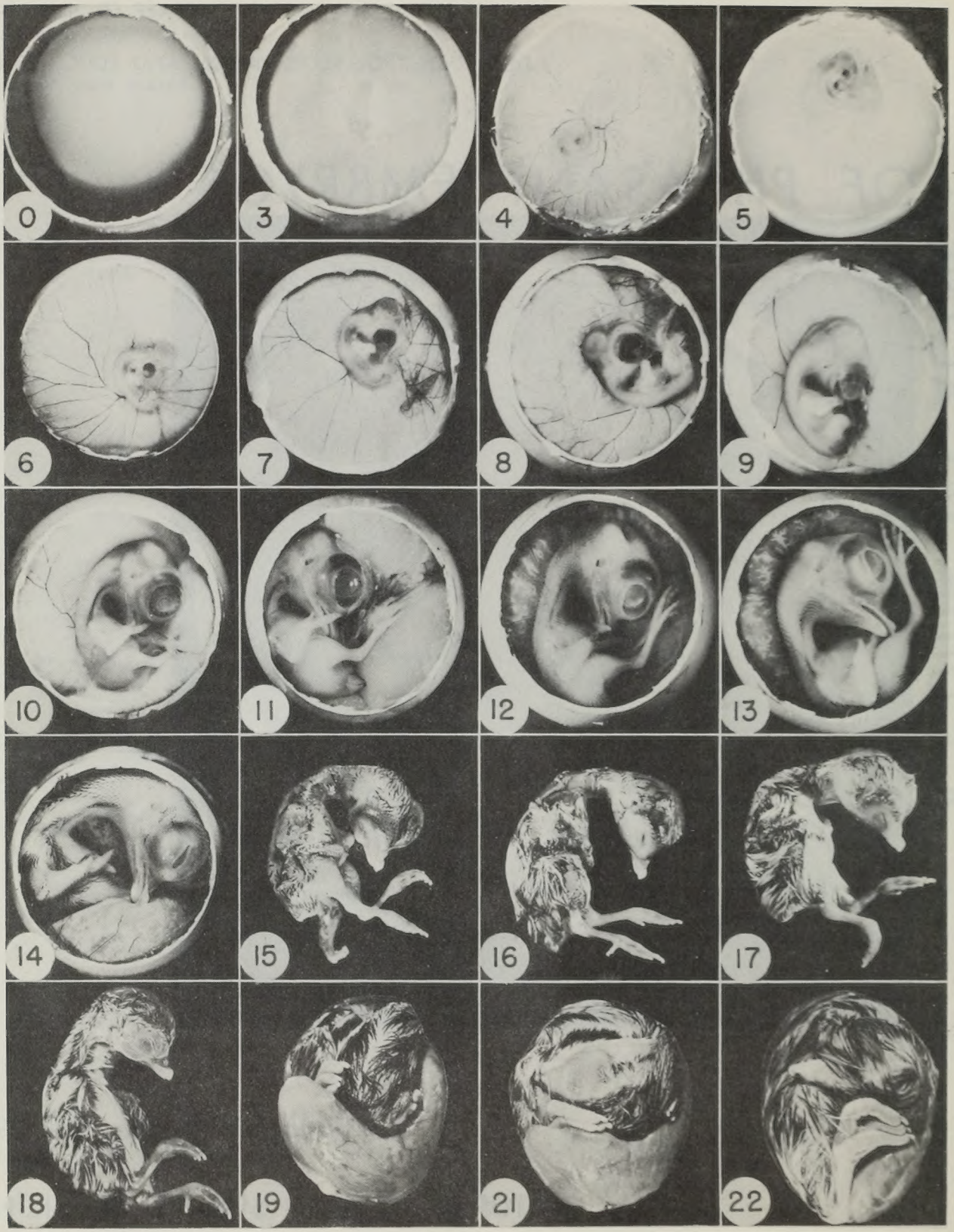

Stages in development of pheasant embryo. Encircled numbers designate ages of embryos in days. Photographs of 15-19-, 21-, and 22-day-old stages depict embryos in lateral positions.

A Guide to Aging of Pheasant Embryos*

Ronald F. Labisky and James F. Opsahl†

This paper presents a series of photographs illustrating the chronological sequence in the development of pheasant (Phasianus colchicus) embryos as an aid to identification of incubation stages of pheasant eggs found in the field. The photographs are accompanied by brief descriptions of the embryonic stages. The identifying criteria are based on prominent external characteristics visible to the unaided eye. Dustman (1949), Westerskov (1950), and Fant (1957) have described various methods and criteria for identifying the stages of embryonic development in the pheasant; this paper supplements the findings of these workers.

Pheasant eggs obtained from the Illinois State Game Farm, Yorkville, were used in the investigation on which this paper is based; the eggs were incubated in a Buckeye incubator under standard incubating conditions. Varying numbers of incubated eggs, but never less than two eggs, were examined for each daily stage of embryonic development; eggs were removed from the incubator for examination at approximately the same hour each day. Because some variation occurred in the development of embryos in eggs incubated for the same length of time, the embryo most closely representing the mean degree of development was selected as typical for each particular stage. All data presented in this paper were based on examination of fresh embryos.

The cover photograph depicts a 13-day-old pheasant embryo; it and all other photographs appearing in this paper were taken by William E. Clark, Illinois Natural History Survey photographer.

Prominent Embryo Characteristics

In the photographs reproduced on the facing page, embryos for days 0 and 3-14 are shown in their natural positions as they would be observed in decapped eggs. Embryos for days 15-19, 21, and 22 are shown as they would be viewed laterally with shells removed. Yolk sacs were removed from the embryos for days 15-18 so that embryo characteristics could be better observed.

Prominent characteristics of embryos of various ages (days old) are described below to supplement the photographs.

0 Day (unincubated): Germinal disc or blastoderm appearing as an area 3-4 millimeters in diameter, lighter in color than surrounding yolk surface.

1 Day: Outer border of blastoderm appearing reticulate in contrast to the more central area; embryo (primitive streak) not flexed and less than 4 millimeters in length; blood vessels not visible.

2 Days: Blastoderm about 20 millimeters in diameter; embryo exceeding 4 millimeters in length; a threadlike network of blood vessels encircling embryo.

3 Days: Embryo rather obscure, but flexed anteriorly; blood vessels evident in anterior portion of embryo; heartbeat not apparent to unaided eye.

4 Days: Entire embryo readily visible (lying on its left side), showing both anterior and posterior flexures; network of blood vessels prominent; heartbeat evident; limb buds, appearing as small rounded swellings, barely discernible; eyes showing no deposition of pigment; development of allantois visible in umbilical region.

5 Days: Embryo now a prominent "C" shape, with tail almost in contact with head; limb buds visible as flaplike structures; eyes showing deposition of dark pigment; allantois extending beyond lower limb buds.

6 Days: Pigmented region of eyes about 2 millimeters in diameter; limb buds appearing as distinct projections from body; cerebral hemispheres (forebrain) and midbrain lobes very prominent.

7 Days: Pigmented region of eyes about 3 millimeters in diameter; limb buds expanded at distal extremities; cerebral hemispheres somewhat less conspicuous, but midbrain lobes greatly accentuated.

8 Days: Pigmented region of eyes about 4 millimeters in diameter; limb buds showing no visible digitation; midbrain lobes still prominent; upper mandible appearing as a slight protuberance.

9 Days: Both cerebral hemispheres and midbrain lobes smaller in size relative to entire head, but midbrain lobes still prominent; toes evident, but not separated; the wing alulae appearing as thumb-

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† Labisky is employed by the Illinois Department of Conservation under terms of the Federal Aid in Wildlife Restoration Act and assigned to the Illinois Natural History Survey for administrative and technical supervision. Opsahl was formerly employed in this capacity; his present address is Winona State College, Winona, Minnesota.

like projections; upper and lower mandibles present; auditory opening readily discernible; pipping tooth barely discernible.

10 Days: Midbrain appearing as moderate protuberance; prominent blood vessel visible along side of neck from base of skull to base of anterior appendages; toes partially separated; heart beat no longer visible; feather papillae evident on head, spinal tract, and thighs.

11 Days: Toes completely separated; feather papillae discernible in all feather tracts; midbrain appearing as only a slight protuberance; nostrils readily discernible.

12 Days: Feathering (darkly pigmented) appearing along spinal tract and about tail; development of phalanges evident.

13 Days: Embryo appearing on its left side, bill touching abdomen, feet near head; eyelids commencing to close, apertures assuming an oval shape; feathering appearing on thighs and elbows; blood vessel along side of neck still apparent.

14 Days: Feathering appearing on anterior edges of auditory openings and on top of head and upper margins of eye; scales on legs and feet barely discernible.

15 Days: Lateral view shown in figure; shell and yolk sac removed. Natural position of embryo as seen in decapped egg: the long axis of embryo lying parallel to long axis of egg, with head lying near the large end of the egg (prior to this time, the long axis of the embryo at right angles to the long axis of the egg). Feathering continuous dorsally from base of beak to tail; scales on legs and feet readily discernible; spur papillae evident.

16 Days: Lateral view shown in figure; shell and yolk sac removed. Narrow semicircular bands of feathers extending lateroventrally from the anterior border of auditory openings to base of lower mandible; feathers present about eyes but not well developed; apertures of eyes assuming proportions near normal for newly hatched chick.

17 Days: Lateral view shown in figure; shell and yolk sac removed. Embryo almost entirely covered by down feathers, except on dorsolateral aspects of head.

18 Days: Lateral view shown in figure; shell and yolk sac removed. Feathering well advanced; eyelids closed; eyes now appearing normal in relation to head of chick; development of webbing between toes evident.

19 Days: Lateral view shown in figure; shell removed. Natural position of embryo as seen in decapped egg: head lying on its left side with right ear and eye in view; beak partially concealed by yolk sac; right foot touching top of head, and left foot touching lateral aspect of head; right wing starting to pass over head; head commencing to rotate to the right.

20 Days: Natural position of embryo as seen in decapped egg: head continuing to rotate to the right, with right wing shifting over head. Feathering of embryo nearly complete; webbing of toes well defined.

21 Days: Lateral view shown in figure; shell removed. Natural position of embryo as seen in decapped egg: embryo arched into pipping position; head nearly covered by right wing (natural position of wing shifted in photo to better show position of head and beak); beak projecting from beneath right wing, with pipping tooth lying in close proximity to egg shell.

22 Days: Lateral view shown in figure; shell removed. Natural position of embryo as seen in decapped egg: position similar to that of 21-day embryo; right wing covering head except for beak; beak now in contact with egg shell; yolk sac nearly absorbed.

23 Days: Pipping of shell completed. Embryo emerges as hatched pheasant chick.

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